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ABSTRACT

The product of several years of research and development at Brigham Young University, Instructor's Plan (IP) is an expert system for rapid lesson design and authoring. Its primary audience is preservice and inservice school teachers. It will run on IBM PC, XT, AT, and PS/2 systems and compatibles with a color monitor and at least one floppy disk drive. IP's central feature is its expert system, which possesses two primary components: a knowledge base and an inference engine. Founded on instructional theory that proposes that specific learning conditions require different instructional strategies or strategy modifications in order to optimize learning, the knowledge base contains both production rules and instructional strategies. The instructor can access directly and make modifications to the instructional strategy aspect. The inference engine manages the knowledge base and the inferencing process, governing the questions posed to the instructor and the searching of rules, and testing the goals of the expert system to see if they have been accomplished. IP considers two main categories of learning conditions when determining the best instructional strategy--learning outcome and instructional mode--and identifies eight learning outcomes: response, recitation, explanation, classification, prediction, decision, performance, and problem solving. The instructional mode refers to whether the lesson is more instructor or learner centered and controlled. Formative evaluation has shown that instructors find IP very easy to learn to use and they report that it reduces planning time and improves the quality of their lesson design. (11 references) (BBM)

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Instructor's Plan: A Lesson Planning Expert System for School Teachers

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Instructor's Plan (IP) is an expert system for rapid lesson design and authoring. It is the product of several years of research and development at Brigham Young University and has received about two years of beta-testing by a large number of instructors (Wilkins, 1990). Its primary audience is preservice and inservice school teachers, with potential secondary audiences of higher education professors and corporate trainers. The main purpose of IP is to provide instructors with an intelligent productivity tool and job aid. A secondary purpose is to teach instructors good design principles. IP will run on IBM PC, XT, AT, and PS/2 systems and compatibles with a color monitor and at least one floppy disk drive.

The central feature of IP is its expert system possessing the primary components typically found in other expert systems, namely the knowledge base and inference engine (Townsend & Feucht, 1986). IP's knowledge base has two main aspects contained in several files. First, the strategy selection aspect of the knowledge base resides in an executable file along with the rest of the compiled source code. Here knowledge is represented in the form of production rules (Bahrami, 1988). Many of these rules contain certainty factors used in the inferencing process of the expert system (Levine, Drang, & Edelson, 1988). This allows IP to deal with a considerable amount of uncertainty related to the instructional conditions at hand. Second, the instructional strategies aspect of the knowledge base is contained in structured files read by the program. This permits the instructor to directly access the strategies and make modifications to that aspect of the knowledge base.

The inference engine in IP manages the knowledge base and the inferencing process. It governs the questions posed to the instructor and the searching of rules, and tests the goals of the expert system to see if they have been accomplished (Nebendahl, 1988).

The knowledge base of IP is founded on instructional theory that proposes that specific learning conditions require different instructional strategies or strategy modifications in order to optimize learning (Briggs, 1977; Gagné, Briggs, & Wager, 1988; Merrill & Goodman, 1972). IP considers two main categories of learning conditions when determining the best instructional strategy: (1) learning outcome and (2) instructional mode. IP identifies eight levels of learning outcomes and two levels of instructional modes conceptualized as a matrix containing 16 instructional strategies. The eight learning outcomes in IP are as follows:

Response	Paired-associate learning,
Recitation	Memorized verbal information
Explanation	Conceptual understandings of verbal information
Classification	Applying concrete or defined concepts
Prediction	Applying natural laws
Decision	Applying rules of action
Performance	Applying intellectual or physical procedures
Problem Solving	Applying a heuristic process or developing a creative product

The other dimension of the conceptualized matrix is the instructional mode. This refers to whether the lesson is more instructor or learner centered and controlled. The two levels employed are (1) direct instruction and (2) indirect instruction (Borich, 1988). Direct instruction refers to an expository or a more instructor directed approach (Rosenshine,

1986), while indirect instruction refers to a discovery or a more learner directed approach (Harris, Heil & Young, 1983).

The main menu contains the following options:

New Plan	For initializing a new lesson. Here the user can enter the lesson's title and date to be given.
Load Plan	For loading a previously designed and saved plan from any dictionary and drive.
Design Plan	This is the expert system portion of the program. The user answers the multiple choice questions posed by the expert system. The expert system then selects the most appropriate instructional strategy.
Edit Plan	Here the user can add subject matter to a strategy, modify a strategy, create a personalized strategy, etc.
Save Plan	This option is for saving Instructor's Plan files on a directory and rive of choice.
Print Plan	This feature allows the user to print a formatted lesson plan as an ASCII file to a printer or disk.
Quit	Here the user exits the program.

Formative evaluation has shown that instructors find IP very easy to learn to use and they report that it reduces planning time. Instructors who use the program believe its main strength is to improve the quality of their lesson design.References

References

Bahrami, A. (1988). *Designing artificial intelligence based software.* Wilmslow: Sigma Press.

Borich, G. D. (1988). *Effective teaching methods.* Columbus: Merrill Publishing Company.

Briggs, L. J. (1977). The teacher as designer. In L. J. Briggs (Ed.), *Instructional design: Principles and applications.* Englewood Cliffs: Educational Technology Publications.

Gagné, R. M., Briggs, L. J., & Wager W. W. (1988). *Principles of instructional design,* 3rd Ed. New York: Holt, Rinehart, and Winston.

Harris, R. C., Heil, L. H., & Young, J. R. (1983). *Teaching and learning: Psychological and philosophical precepts.* Minneapolis: Burgess Publishing Company.

Levine, R. I., Drang, D. E., & Edelson, B. (1988). *A comprehensive guide to AI and expert systems using turbo pascal.* New York: McGraw-Hill Book Company.

Merrill, M. D., & Goodman, R. I. (1972). *Selecting instructional strategies and media: A place to begin.* National Special Media Institutes.

Nebendahl, D. (1988). *Expert systems: Introduction to the technology and applications.* John Wiley & Sons, Ltd.

Rosenshine, B. V. (1986, April). Synthesis of research on explicit teaching. *Educational Leadership,* 60-69.

Townsend, C., & Feucht, D. (1986). *Designing and programming personal expert systems.* Blue Ridge Summit: Tab Books, Inc.

Wilkins, D. A. (1990). *An introduction to instructor's plan: An expert system for rapid lesson authoring.* A system demonstration at the annual Utah State University Summer Instructional Technology Institute, Logan, Utah, July 26, 1990.